UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/580,128	05/19/2006	Michael Holzemer	LYBZ 200104US01	9229

27885   7590   04/07/2011

FAY SHARPE LLP
1228 Euclid Avenue, 5th Floor
The Halle Building
Cleveland, OH 44115

EXAMINER
KASTURE, DNYANESH G

ART UNIT	PAPER NUMBER
3746	

MAIL DATE	DELIVERY MODE
04/07/2011	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

PTOL-90A (Rev. 04/07)

<table>
<tr><td rowspan="2">Office Action Summary</td><td>Application No.
10/580,128</td><td>Applicant(s)
HOLZEMER ET AL.</td></tr>
<tr><td>Examiner
DNYANESH KASTURE</td><td>Art Unit
3746</td><td></td></tr>
</table>

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on <u>21 March 2011</u>.
2a)☒ This action is **FINAL**.   2b)☐ This action is non-final.
3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) <u>1-9,12-15,17,20 and 21</u> is/are pending in the application.
    4a) Of the above claim(s) _____ is/are withdrawn from consideration.
5)☐ Claim(s) _____ is/are allowed.
6)☒ Claim(s) <u>1-9,12-15,17,20 and 21</u> is/are rejected.
7)☐ Claim(s) _____ is/are objected to.
8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.
10)☒ The drawing(s) filed on <u>19 May 2006</u> is/are: a)☒ accepted or b)☐ objected to by the Examiner.
    Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
    Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
    a)☒ All   b)☐ Some * c)☐ None of:
      1.☒ Certified copies of the priority documents have been received.
      2.☐ Certified copies of the priority documents have been received in Application No. _____.
      3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
    * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08)
    Paper No(s)/Mail Date _____.

4) ☐ Interview Summary (PTO-413)
    Paper No(s)/Mail Date. _____.
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

FINAL REJECTION

This office action is in response to the amendment and remarks filed on 03/21/2011.

Claims 1 – 9, 12 – 15, 17, 20 and 21 are pending and currently being examined.

Claim Rejections - 35 USC § 103

1.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set
> forth in section 102 of this title, if the differences between the subject matter sought to be patented and
> the prior art are such that the subject matter as a whole would have been obvious at the time the
> invention was made to a person having ordinary skill in the art to which said subject matter pertains.
> Patentability shall not be negatived by the manner in which the invention was made.

2.   Claims 1, 3, 8, 13 and 14 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Ando (US Patent 6,375,431 B1) in view of Wang (US Patent

6,539,714 B1)

3.   In Re Claim 1, with reference to Figures 1 and 4, Ando discloses a positive

displacement vacuum pump ("A") comprising a drive motor (143), a way to measure

inlet pressure (inherent from pressure measurements at the suction port that generate

the data in Figure 7) and a method for controlling a drive motor of the pump that is

implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating

apparatus of this invention, a driving motor for each of the booster screw vacuum pump

and the roughing screw vacuum pump is rotated at as high a rotating speed as possible

as far as the motor is not overloaded, to shorten the exhaust time, in a range where the

suction side pressure of the booster screw vacuum pump is relatively high. When the

suction side pressure of the booster screw vacuum pump has reached the ultimate

pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the

driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating

speed to maintain a degree of vacuum required for the evacuated chamber, and the

rotating speed of the driving motor for the roughing screw vacuum pump is reduced to

as low a rotating speed as possible ..".

●   The method of storing a relationship of speed versus inlet pressure is anticipated

by the above disclosure because the controller would have to know that for each value

of inlet pressure between high (atmospheric) pressure and "a relatively low pressure"

the respective motor speed that the motor is driven at is the "as high a rotating speed as

possible". Therefore this information would have to be stored in a manner that can be

accessed by the controller. Note that the relationship is a continuous function (related

to continuous curve) because the controller would have to know what to do with the

speed at every value of inlet pressure above the "relatively low pressure". Note also

that Applicant's Figure 2 allows for a "curve" to have straight portions (Above P1 and

below P2)

●   The above disclosure also anticipates the curve's claimed upper range as

follows: in the phrase "a driving motor for the booster screw vacuum pump and the

roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS

POSSIBLE"; the "as high a rotating speed as possible" corresponds to applicant's n1

until the suction side pressure has reached "a relatively low pressure" – which is

applicant's P1

●   The above disclosure also anticipates the curve's claimed alteration range as

follows: the phrase "When the suction side pressure of the booster screw vacuum pump

has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the

rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to

the lowest rotating speed to maintain a degree of vacuum required for the evacuated

chamber" implies that for ALL values of inlet pressure below P1, the associated

corresponding speed value n is "the lowest rotating speed to maintain a degree of

vacuum required for the evacuated chamber". Clearly n is less than or equal to n1.

The newly added limitation "different" does not overcome this rejection, as discussed

below with reference to a schematic that illustrates the pumpdown (evacuation) process

of the chamber described in the referenced paragraph:
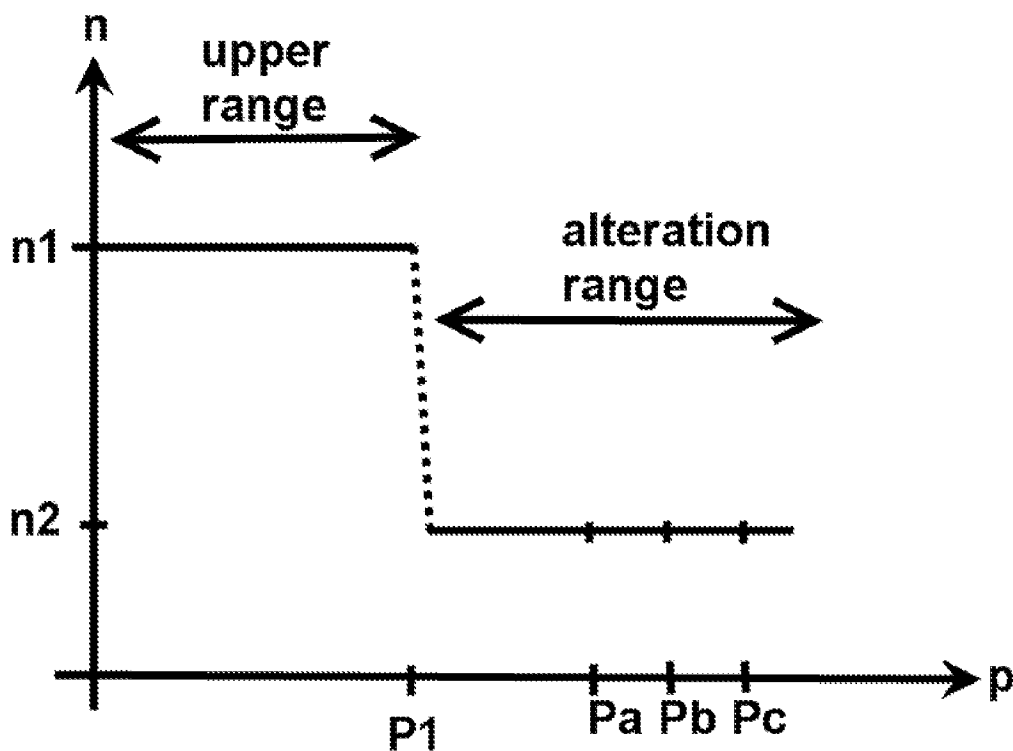
**Schematic representation of Ando's
pumpdown in Column 7, Lines 16-29**

Each inlet pressure value p (such as "Pa", "Pb", "Pc" annotated above) in the alternation

range is associated with a corresponding speed value n2 <u>that is different from speed</u>

<u>value n1</u> corresponding to the upper range

●   The above disclosure also anticipates determining the inlet pressure, determining

the speed corresponding to the inlet pressure and operating the motor at the

determined speed, because the inlet pressure would have to be read in order to

determine whether the motor should be driven at speed n1 or n.

4.   Although Ando anticipates storing a relationship of speed versus inlet pressure,

Ando does not disclose that the relationship is stored in the form of a curve, followed by

the step of determining the speed parameter from the curve.

5.   Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure

3, Wang discloses a method of determining turbocharger (the compressor part of which

is a pump) rotational speed (TS_E) based on readings from a compressor (pump) inlet

pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to

determine a parameter (CTS) related to speed from a parameter (PR) related to inlet

pressure. Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for

a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The

CTS value corresponding to the CIP is read from the plot and is multiplied by the square

root of CIT to determine the speed TS_E.

6.   It would have been obvious to a person having ordinary skill in the art at the time

of the invention to store the speed pressure relationship of Ando in the form of a curve

as suggested by Wang and to determine a speed from the curve corresponding to an

inlet pressure reading for the purpose of automating the system (since an operator

would not be needed, the control function would be performed by a microprocessor). It

has been held that automating a manual activity which has accomplished the same

result involves only routine skill in the art - MPEP 2144.04 (III).

7.   In Re Claim 3, with reference to Figures 1 and 4, Ando discloses a positive

displacement vacuum pump ("A") comprising a drive motor (143), a way to measure

inlet pressure (inherent from pressure measurements at the suction port that generate

the data in Figure 7) and a method for controlling a drive motor of the pump that is

implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating

apparatus of this invention, a driving motor for each of the booster screw vacuum pump

and the roughing screw vacuum pump is rotated at as high a rotating speed as possible

as far as the motor is not overloaded, to shorten the exhaust time, in a range where the

suction side pressure of the booster screw vacuum pump is relatively high. When the

suction side pressure of the booster screw vacuum pump has reached the ultimate

pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the

driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating

speed to maintain a degree of vacuum required for the evacuated chamber, and the

rotating speed of the driving motor for the roughing screw vacuum pump is reduced to

as low a rotating speed as possible ..".

● The method of storing a relationship of speed versus inlet pressure is anticipated by the above disclosure because the controller would have to know that for each value of inlet pressure below "a relatively low pressure" the motor speed is "reduced to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber". Therefore this information would have to be stored in a manner that can be accessed by the controller. Note that the relationship is a continuous function (related to continuous curve) because the controller would have to know what to do with the speed at every value of inlet pressure below the "relatively low pressure". Note also that Applicant's Figure 2 allows for a "curve" to have straight portions (Above P1 and below P2)

● The above disclosure also anticipates the curve's claimed lower range as follows: in the phrase "When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber" the "relatively low pressure" reads on applicant's lower limit pressure P2 as claimed, and "the lowest rotating speed to maintain a degree of vacuum required" reads on applicant's single constant lower speed n2 as claimed

● The above disclosure also anticipates the curve's claimed alteration range as follows: in the phrase "a driving motor for the booster screw vacuum pump and the roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS POSSIBLE as far as the motor is not overloaded, to shorten the exhaust time, in a

range where the suction side pressure of the booster screw vacuum pump IS

RELATIVELY HIGH" the "suction side pressure of the booster vacuum pump is

relatively high" corresponds to all inlet pressure values larger than P2 where the

corresponding speed value n is "as high a rotating speed as possible". Clearly n is

greater than n2. The newly added limitation "different" does not overcome this rejection,

as discussed below with reference to a schematic that illustrates the pumpdown

(evacuation) process of the chamber described in the referenced paragraph:
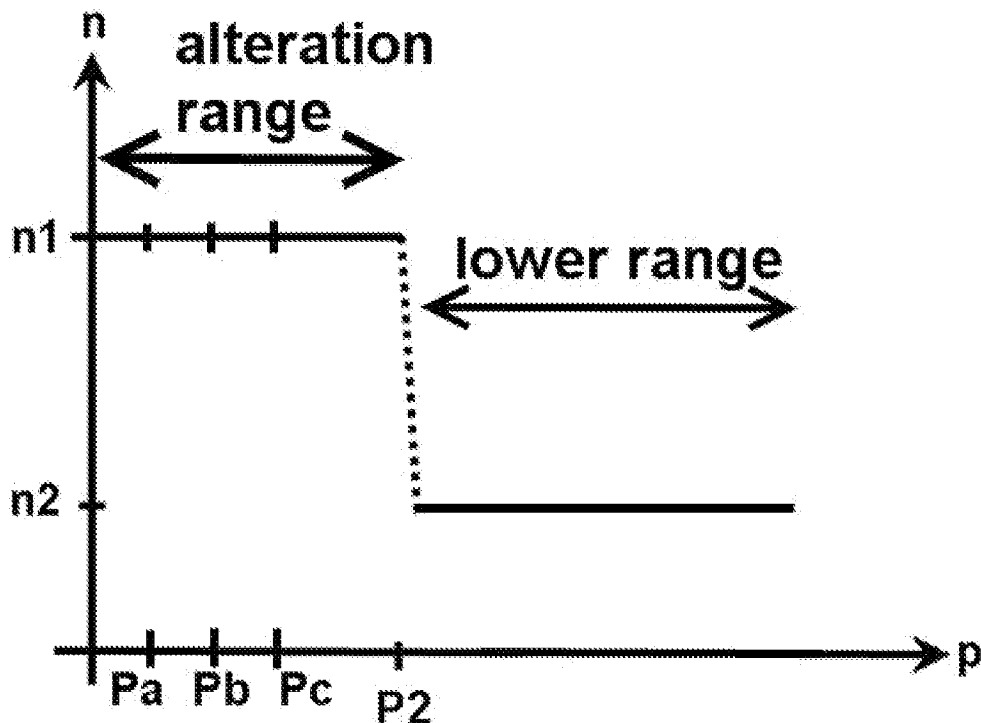
Schematic representation of Ando's
pumpdown in Column 7, Lines 16-29

Each inlet pressure value p (such as "Pa", "Pb", "Pc" annotated above) in the alteration

range is associated with a corresponding speed value n1 <u>that is different from speed</u>

<u>value n2</u> corresponding to the lower range.

●   The above disclosure also anticipates determining the inlet pressure, determining

the speed corresponding to the inlet pressure and operating the motor at the

determined speed, because the inlet pressure would have to be read in order to

determine whether the motor should be driven at speed n or n2.

8.   Although Ando anticipates storing a relationship of speed versus inlet pressure,

Ando does not disclose that the relationship is stored in the form of a curve, followed by

the step of determining the speed parameter from the curve.

9.   Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure

3, Wang discloses a method of determining turbocharger (the compressor part of which

is a pump) rotational speed (TS_E) based on readings from a compressor (pump) inlet

pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to

determine a parameter (CTS) related to speed from a parameter (PR) related to inlet

pressure.   Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for

a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The

CTS value corresponding to the CIP is read from the plot and is multiplied by the square

root of CIT to determine the speed TS_E.

10.   It would have been obvious to a person having ordinary skill in the art at the time

of the invention to store the speed pressure relationship of Ando in the form of a curve

as suggested by Wang and to determine a speed from the curve corresponding to an

inlet pressure reading for the purpose of automating the system (since an operator

would not be needed, the control function would be performed by a microprocessor). It

has been held that automating a manual activity which has accomplished the same

result involves only routine skill in the art - MPEP 2144.04 (III).

11.   In Re Claims 8 and 14, Figure 3 of Wang is clearly a diagram that is

characteristic of a relationship between parameters related to speed and pressure.

12.   In Re Claim 13, the positive displacement pump ("A") of Ando is arranged

upstream of high vacuum pump ("B") as seen in Figure 1, and suction port (110a) is on

the suction side of the flow path of the high vacuum pump.

13.   Claims 2, 4 - 7, 12, 17, 20 and 21 are rejected under 35 U.S.C. 103(a) as being

unpatentable over Ando (US Patent 6,375,431 B1) in view of Wang (US Patent

6,539,714 B1) and further in view of Bishop et al (PG Pub US 20030206805 A1)

14.   In Re Claim 2, with reference to Figures 1 and 4, Ando discloses a positive

displacement vacuum pump ("A") comprising a drive motor (143), a way to measure

inlet pressure (inherent from pressure measurements at the suction port that generate

the data in Figure 7) and a method for controlling a drive motor of the pump that is

implied from the following disclosure in Column 7, Lines 16-29: "In the evacuating

apparatus of this invention, a driving motor for each of the booster screw vacuum pump
and the roughing screw vacuum pump is rotated at as high a rotating speed as possible
as far as the motor is not overloaded, to shorten the exhaust time, in a range where the
suction side pressure of the booster screw vacuum pump is relatively high. When the
suction side pressure of the booster screw vacuum pump has reached the ultimate
pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the
driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating
speed to maintain a degree of vacuum required for the evacuated chamber, and the
rotating speed of the driving motor for the roughing screw vacuum pump is reduced to
as low a rotating speed as possible ..".

●   The method of storing a relationship of speed versus inlet pressure is anticipated
by the above disclosure because the controller would have to know that for each value
of inlet pressure between atmospheric pressure and "a relatively low pressure" the
respective motor speed that the motor is driven at is the "as high a rotating speed as
possible". Further, the controller would have to know that for each value of inlet
pressure below "a relatively low pressure" the motor speed is "reduced to the lowest
rotating speed to maintain a degree of vacuum required for the evacuated chamber".
Therefore this information would have to be stored in a manner that can be accessed by
the controller. Note that the relationship is a continuous function (related to a
continuous curve) because the controller would have to know what to do with the speed
at EVERY value of inlet pressure above the "relatively low pressure", and below the

"relatively low pressure". Note also that Applicant's Figure 2 allows for a "curve" to have straight portions (Above P1 and below P2)

● The above disclosure also anticipates the curve's claimed upper range as follows: in the phrase "a driving motor for the booster screw vacuum pump and the roughing screw vacuum pump is rotated at AS HIGH A ROTATING SPEED AS POSSIBLE"; the "as high a rotating speed as possible" corresponds to applicant's n1 until the suction side pressure has reached "a relatively low pressure" – which is applicant's P1

● The above disclosure also anticipates the constant speed associated with curve's claimed lower range as follows: in the phrase "When the suction side pressure of the booster screw vacuum pump has reached the ultimate pressure or BECOME A RELATIVELY LOW PRESSURE, the rotating speed of the driving motor for the booster screw vacuum pump is REDUCED to the lowest rotating speed to maintain a degree of vacuum required for the evacuated chamber" the "lowest rotating speed to maintain a degree of vacuum required" reads on applicant's single constant lower speed n2 as claimed

● The above disclosure also anticipates determining the inlet pressure, determining the speed corresponding to the inlet pressure and operating the motor at the determined speed, because the inlet pressure would have to be read in order to determine whether the motor should be driven at speed n1 or n2.

15.   However, Ando does not disclose an alteration range for inlet pressures smaller than the upper limit pressure P1 and larger than the lower limit pressure P2 (claim

language: "alteration range limited to inlet pressure values p larger than the lower limit

pressure P2"), because Ando does not disclose the manner in which "the rotating speed

of the driving motor for the booster screw vacuum pump is REDUCED to the lowest

rotating speed to maintain a degree of vacuum required for the evacuated chamber". In

other words, Ando does not disclose the manner in which the speed is reduced from n1

to n2.

16.   Nevertheless, Bishop et al discloses a method of controlling a pump motor in

Paragraph [0053]: "the invention provides an improved hydraulic pump in which a

pumping unit is driven with a variable speed, THE SPEED BEING SET ACCORDING

TO THE PRESSURE DEMANDED BY THE LOAD SO AS TO YIELD A RELATIVELY

CONSTANT POWER OUTPUT OF THE PUMP in terms of pressure and flow rate."

17.   It would have been obvious to a person having ordinary skill in the art at the time

of the invention to reduce the speed of the motor of Ando from n1 to n2 in a manner that

maintains constant power output of the pump as suggested by Bishop et al for the

purpose of reducing fatigue/stress on the motor. Note that in the process of reducing

the speed from n1 to n2, the motor is still running, therefore the inlet pressure would

continue to drop below P1. It would be routine skill to generate a set of rules that would

operate the motor at an appropriate speed value n that maintains constant power output

of the pump corresponding to the inlet pressure p, since the vacuum pump power output

depends on the pump speed n and pump inlet pressure p. The inlet pressure value P2

as claimed is the inlet pressure that maintains constant power corresponding to speed

n2. In other words, the power output at speed n1 and inlet pressure p1 is equal to the

power output at speed n2 and inlet pressure p2. Clearly, P1 is greater than P2 as

claimed because the inlet pressure continues to drop from the operation of the pump.

18.   Although Ando modified by Wang anticipates storing a relationship of speed

versus inlet pressure, Ando does not disclose that the relationship is stored in the form

of a curve, followed by the step of determining the speed parameter from the curve.

19.   Nevertheless, with reference to the flow chart of Figure 4, and the plot in Figure

3, Wang discloses a method of determining turbocharger (the compressor part of which

is a pump) rotational speed (TS_E) based on readings from a compressor (pump) inlet

pressure (CIP) sensor, with the intermediate step of using a curved surface (Figure 3) to

determine a parameter (CTS) related to speed from a parameter (PR) related to inlet

pressure.   Equation (5) in Column 7, Line 9 discloses a polynomial equation for PR for

a given value of ES. The pressure ratio PR is related to the inlet pressure CIP. The

CTS value corresponding to the CIP is read from the plot and is multiplied by the square

root of CIT to determine the speed TS_E.

20.   It would have been obvious to a person having ordinary skill in the art at the time

of the invention to store the speed pressure relationship of Ando in the form of a curve

as suggested by Wang and to determine a speed from the curve corresponding to an

inlet pressure reading for the purpose of automating the system (since an operator

would not be needed, the control function would be performed by a microprocessor). It

has been held that automating a manual activity which has accomplished the same

result involves only routine skill in the art - MPEP 2144.04 (III).

21.   In Re Claim 4, in accordance with the teachings of Bishop et al, as the inlet
pressure decreases, the speed would have to decrease in order to maintain constant
power output in the alteration range.

22.   In Re Claims 5 and 6, it would have been obvious to a person having ordinary
skill in the art to operate the speeds in the claimed ranges at the pressures in the
claimed ranges since it has been held that where the general conditions of a claim are
disclosed in the prior art, discovering the optimum or workable ranges involves only
routine skill in the art – MPEP 2144.05 (II-A).

23.   In Re Claim 7, the positive displacement pump ("A") of Ando is arranged
upstream of high vacuum pump ("B") as seen in Figure 1, and suction port (110a) is on
the suction side of the flow path of the high vacuum pump.

24.   In Re Claim 12, Ando and Bishop et al as applied to Claims 2 and 4 disclose all
the claimed limitations.

25.   In Re Claim 17, Wang discloses an inlet pressure sensor (Abstract) and a
memory (45) that stores the preselected relationship between an inlet pressure related
parameter and a speed related parameter. Ando, Wang and Bishop et al as applied to
Claim 2 discloses all the claimed limitations.

26.   In Re Claim 20, as discussed in Claim 2, the relationship between the inlet

pressure and drive speed is a continuous curve (Applicant's Figure 2 allows for a

"curve" to have straight portions (Above P1 and below P2).

27.   In Re Claim 21, maintaining the constant power output as suggested by Bishop

necessitates a different drive speed for each inlet pressure because a larger pressure

head would have to correspond to a lower speed:

The power output of a pump by definition is the product of the pressure head and flow

rate generated by the pump. Since a vacuum pump works against atmospheric

pressure;

         Power = Flow rate x (Atmospheric Pressure – Chamber Pressure)

For positive displacement pumps, the speed of the motor is proportional to the flow rate.

Therefore the above equation can be rewritten as:

         Power = Constant x Speed x (Atmospheric Pressure – Chamber Pressure)

For Constant power output as suggested by Bishop, the above equation becomes:

         Speed x (Atmospheric Pressure – Chamber Pressure) = Constant

It is clear from the above equation that in the alteration range, as chamber pressure

reduces during evacuation, the Speed would also be reduced to meet this equation.

Further, each value of Chamber Pressure would have a unique (different) value of

Speed that would satisfy the above equation.

28.   Claims 9 and 15 are rejected under 35 U.S.C. 103(a) as being unpatentable over

Ando (US Patent 6,375,431 B1) in view of Wang (US Patent 6,539,714 B1) and further

in view of de-Simon et al (US Patent 5,971,725 A)

29.   In Re Claims 9 and 15, Ando and Wang as applied to Claims 1 and 3

respectively disclose all the claimed limitations except for the drive motor being an

asynchronous motor.

30.   Nevertheless, de-Simon et al discloses in Column 5, Lines 24-25 that a vacuum

pumping device incorporates a 3 phase AC asynchronous motor.

31.   It would have been obvious to a person having ordinary skill in the art at the time

of the invention to use an asynchronous motor as taught by de-Simon et al to drive the

pump of Ando due to its self starting ability and ease of operation.

Response to Arguments

32.   Applicant has argued on Page 6 of Applicant's Response that the passage of

Ando ("as high a rotating speed as possible") referenced by the examiner does not

allegedly mean that the speed is constant, and that the quoted passage allegedly only

implies that the rotating speed is as high as possible for each pressure value.

33.   Examiner's Response: The referenced passage does not relate the highest

possible speed to PRESSURE as alleged, the passage only refers to the highest

possible speed without OVERLOADING the motor. There is no indication in the

referenced passage that the rotating speed is as high as possible for each pressure

value. On the contrary there is an indication in Figure 7 that the highest rotating speed

possible is constant from about 1000 to 100000 as annotated below:

A: PRESSURE OF SUCTION PORT 110a
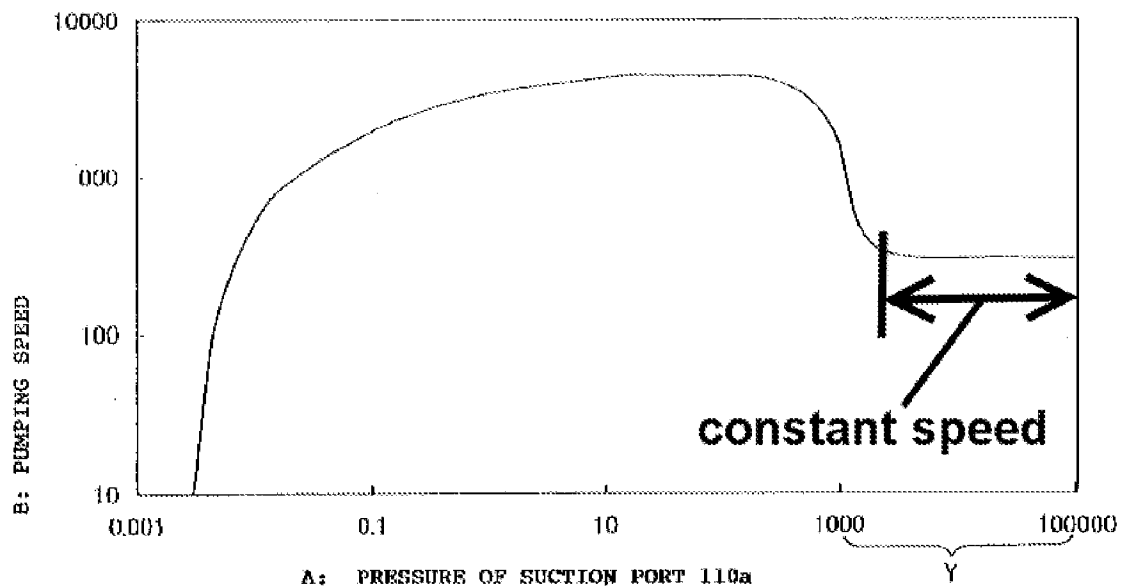
The annotated range in the figure above refers to pumping speed or flow rate (liters /

minute), however, it also implies constant motor speed because in positive

displacement pumps, the flow rate is proportional to motor speed. During the initial

evacuation (pumpdown), when chamber pressure is relatively high, the pressure head is

relatively low and the motor has more than enough power to operate the pump at the

maximum speed (highest speed possible without any danger of overloading). Note that

even under no-load conditions the motor speed is not unlimited, there should be a

unique maximum value based on design parameters. Note also that motors are
generally capable of maintaining speed under variety of load conditions.

34.   Applicant has argued on Page 6 of Applicant's Response that Ando does not
disclose any kind of an alteration range of a continuous curve.

35.   Examiner's Response: The word alteration is a functional limitation, the values of
pressure are clearly being altered continuously during evacuation. There is clearly a
range above the "relatively low pressure" of Ando where the speed is the maximum
possible. The variation in pressure versus speed is continuous because every value of
pressure has a corresponding motor speed. The curve corresponding to this variation is
merely a representation of the speed-pressure data set, the dataset representation is
disclosed by the Wang reference.

36.   Applicant has argued on Page 6 of Applicant's Response that Ando does not
disclose a range in which each inlet pressure value p is associated with a <u>different</u>
corresponding speed value n. Applicant further argues that the lowest rotating speed to
maintain a degree of vacuum does not mean that a <u>different</u> speed value n is
associated with each inlet pressure p of the alteration range.

37.   Examiner's Response: The newly added claim limitation "different" does not
overcome the Ando reference. As discussed in the rejection of Claim 1, each inlet
pressure value p (Pa, Pb, Pc) in the alternation range is associated with a
corresponding speed value n2 <u>that is different from speed value n1</u> corresponding to the

upper range. Similarly, as discussed in the rejection of Claim 3, each inlet pressure

value p (Pa, Pb, Pc) in the alteration range is associated with a corresponding speed

value n1 _that is different from speed value n2_ corresponding to the lower range.

Therefore Ando reads on the claims when they are given the broadest reasonable

interpretation.

38.   Applicant has argued on Page 7 of Applicant's Response that Ando does not

disclose determining from a continuous curve, a speed associated with a determined

inlet pressure value in the curve.

39.   Examiner's Response: The referenced passage of Ando discloses that when the

pressure reaches a relatively low pressure, the speed of the drive motor is reduced to a

value sufficient to maintain a degree of vacuum required for the evacuated chamber.

This implies that the inlet pressure has to be monitored (determining inlet pressure

value) in order to determine whether the relatively low pressure has been reached. If

the relatively low pressure has not been reached, then the speed associated with the

determined inlet pressure value is simply the as-high-a-rotating-speed-as-possible.

After the relatively low pressure has been reached, the speed associated with the

determined inlet pressure value is simply the value sufficient to maintain a degree of

vacuum required for the evacuated chamber. Therefore Ando discloses determining a

speed associated with a determined inlet pressure value and the functional relationship

between pressure and speed. The functional relationship is continuous because every

value of inlet pressure has a corresponding speed value. Although Ando does not

disclose the dataset of the functional relationship in the form of a curve, Wang discloses

that a dataset can be represented in the form of a stored curve, and it is routine skill to

represent the known pressure-speed relationship of Ando in the form of a stored curve,

and to use the stored curve to determine speed values corresponding to the read inlet

pressure values.

40.   Applicant has argued on Page 7 of Applicant's Response that the paragraph

referenced by the Examiner, is "substantially a repetition of claim 7 of Ando. It is

submitted that the detailed description of Ando shows more clearly the Ando process

and behavior than the highly generalized claim-type language relied upon by the

Examiner".

41.   Examiner's Response: MPEP 2141.02, Section VI states that a prior art

reference must be considered in its entirety, i.e., as a whole, including portions that

would lead away from the claimed invention. W.L. Gore & Associates, Inc. v. Garlock,

Inc., 721 F.2d 1540, 220 USPQ 303 (Fed. Cir. 1983), cert. denied, 469 U.S. 851 (1984).

The teachings of a reference are broader than just the specific language used in the

reference. The reference has to be evaluated as a whole for what it teaches one of

ordinary skill. The "Brief description of the Invention" section of the Ando can therefore

be relied on for the broader teachings of the reference.

42.   Applicant has argued on Page 7 of Applicant's Response that "It is further noted

that Figure 7 of Ando referenced by the Examiner is not a measure of motor speed

versus inlet pressure. Rather, Figure 7 of Ando is a graph which relates inlet pressure to

pumping speed, which Ando measures in liters/minute."

43.   Examiner's Response: Referring to Examiner's previous office action, Figure 7

was only referenced to disclose measuring the inlet pressure (which would have to be

done in order to produce the suction port pressure data in the figure). With regards to

applicant's argument that it relates to pumping speed and not motor speed: the pumping

speed in liters per minute or flow rate is proportional to motor speed in positive

displacement pumps. Therefore a constant pumping speed implies a constant motor

speed.

44.   Applicant has argued on Pages 7-8 that the Wang reference does not overcome

the deficiencies of Ando and that one of ordinary skill would not be motivated to modify

Ando because allegedly Wang and Ando operate in different ways, for different

purposes to achieve different end results.

45.   Examiner's Response: The compressor in the turbocharger of Wang is an

analogous structure to the vacuum pump of Ando. Wang teaches determining the

rotational speed TS_E based on the compressor inlet pressure (CIP) sensor reading and

has a step for using a stored curve (Figure 3) to determine a speed parameter from an

inlet pressure parameter. Wang therefore suggests one of ordinary skill to store the

speed-pressure relationship of Ando in the form of a curve and utilize the stored curve

to determine speed values corresponding to the read inlet pressure values.

Conclusion

46.   The essence of Applicant's alteration range is changing the speed to a value that

is appropriate for the instant pressure in the chamber being evacuated. This reads on a

constant horsepower operation ("constant power output") suggested by the Bishop

reference, as discussed in the rejection of Claim 21.

THIS ACTION IS MADE FINAL. Applicant is reminded of the extension of time

policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE

MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not

mailed until after the end of the THREE-MONTH shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of

the advisory action. In no event, however, will the statutory period for reply expire later

than SIX MONTHS from the mailing date of this final action.

RELEVANT PRIOR ART

47.   The prior art made of record and not relied upon is considered pertinent to

applicant's disclosure. Tuzscon (US Patent 4,174,724 A) discloses in the Background

of the Invention section that a positive displacement pump "provides a flow rate directly

proportional to the speed of rotation of the pumping elements". Cornell (US Patent

4,158,290 A) discloses in the Abstract that "the product of maximum system pressure

and motor output speed (proportional to pump flow) is constant, for a given input

horsepower setting". Lansky et al (US Patent 3,788,076 A) suggests in the abstract that

horsepower is the product of flow rate and pressure: "The series wound pump drive

motor operates at substantially full rated horsepower at all times such that the product

of its speed S and torque T, and hence the product of the pump output flow Q and outlet

pressure P is approximately equal to a constant K, that is, QP = ST = K".

Contact Information

Any inquiry concerning this communication or earlier communications from the

examiner should be directed to DNYANESH KASTURE whose telephone number is

(571)270-3928. The examiner can normally be reached on Mon-Fri, 9:00 AM to 4:00

PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's

supervisor, Devon Kramer can be reached on (571) 272 - 7118. The fax phone number

for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the

Patent Application Information Retrieval (PAIR) system. Status information for

published applications may be obtained from either Private PAIR or Public PAIR.

Status information for unpublished applications is available through Private PAIR only.

For more information about the PAIR system, see http://pair-direct.uspto.gov. Should

you have questions on access to the Private PAIR system, contact the Electronic

Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a

USPTO Customer Service Representative or access to the automated information

system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/William H. Rodríguez/
Primary Examiner, Art Unit 3741

DGK